



Case report

Case report – Death by subcutaneous injection of cyanide in Sri Lanka

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ABSTRACT

An elderly man was stabbed with a needle and syringe onto his abdomen while asleep. He progressively developed respiratory failure and coma and died an hour later. Autopsy findings and laboratory analysis confirmed the death as being due to poisoning by cyanide. This case highlights the need to consider cyanide as a possible agent where there is a rapid death with progressive respiratory failure after injection of an unknown substance. Cyanide poisoning by ingestion is frequently seen in suicidal, accidental and homicidal deaths. To our knowledge, this is the first reported case of cyanide poisoning by injection in Sri Lanka.

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1. Introduction

A 59 year old man was brought dead to hospital around 2.30 am. From the evidence given by his wife, he had been out of the house for some time in the night. He had a dispute with certain people and had later returned and gone to sleep. She had been sleeping in an adjoining room, when she heard him shout that he had been stabbed with a needle onto his abdomen. This had occurred around 1.30 am. She had run into the room where he was sleeping, and noted that a window in the room was open, and that there was a syringe and needle on the bed. He initially had very rapid breathing, which had gradually slowed down. While on the way to hospital, he lost consciousness. He was certified dead on admission. An inquest was ordered into his death.

2. Autopsy findings

At autopsy, there was a single puncture wound, 1 mm in diameter and 2 cm deep on the anterior abdominal wall, situated 7 cm above and 5.5 cm to the right of the umbilicus, surrounded by a circular black discolouration of the skin 1 cm in diameter

(Fig. 1). The puncture extended upto the subcutaneous tissues. On dissection, the blood was bright red in colour. A “bitter almond” odour was detected around the body. There was congestion of the internal organs. The stomach mucosa was unremarkable. Analysis of the contents of the syringe and a blood sample from the deceased confirmed the presence of cyanide by the benzidine-copper acetate method. Death was certified as being due to poisoning by cyanide.

3. Discussion

Cyanide has most frequently been administered by ingestion and by inhalation of toxic fumes. It has been used in suicidal, homicidal and accidental ingestion. In Sri Lanka, accidental poisoning has usually been occupation related. Suicidal poisoning was commonly seen in the recent past among the LTTE terrorist soldiers who wore a cyanide capsule around their neck, which was to be ingested on imminent arrest or capture. One of the authors has conducted autopsies on a child and her mother by ingestion of cyanide. In this instance the mother killed her child subsequently killed herself. Cyanide poisoning by injection is rare. Intramuscular, subcutaneous and intravenous routes have been reported.^{1–3} A case report of a homicide followed by suicide is recorded. In this instance, the father injected his daughter with cyanide into the right flank and subsequently committed suicide by ingestion of cyanide.⁴ Reports of rare dermal exposure following cyanide

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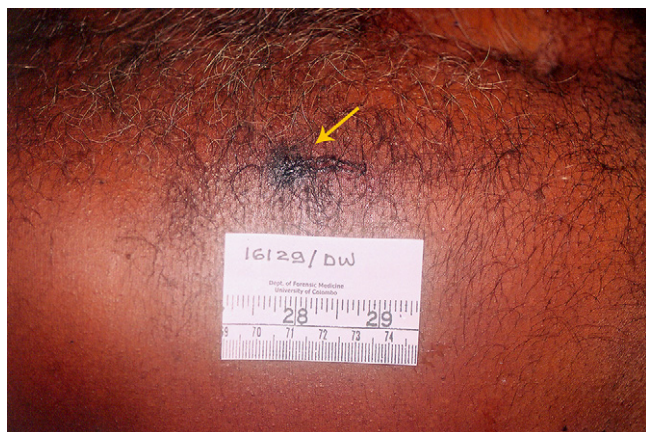


Fig. 1. Injection site with surrounding black discoloration.

poisoning secondary to burns by cyanide salts and immersion in a cyanide solution are also recorded.^{5,6}

The natural history of severe acute cyanide poisoning is a lactic acidosis leading to respiratory failure, coma and death.⁷ Cyanide inhibits mitochondrial cytochrome oxidase, an enzyme system responsible for aerobic cellular respiration. It causes inhibition of aerobic and activation of anaerobic respiration leading to accumulation of lactate, producing metabolic acidosis. Cyanide directly stimulates chemoreceptors in the carotid and aortic bodies causing stimulation of respiration by increasing the respiratory rate and tidal volume, but later, due to histotoxic hypoxia to the respiratory centre, central respiratory depression occurs. Therefore, the respiratory rate slows down and gasping and terminal apnea occurs. This phenomenon was observed in the deceased as described by his wife who noted the initial rapid breathing, which subsequently slowed down. The usual mode of death is central respiratory arrest due to histotoxic hypoxia of the respiratory centre. In addition, direct myocardial depression and hypoxaemia from hypoventilation leads to decreased cardiac output and hypotension,⁸ contributing to a rapid fatality.

The survival period is short and chances of recovery are negligible after such an episode. The literature reports a patient who was brought to hospital in a coma after a subcutaneous self-injection. She was on sustained haemodialysis to correct the severe metabolic acidosis, until the laboratory confirmed that the injected substance was cyanide. In this instance, the patient survived.²

Cyanide in an injectable form, may not show the autopsy features usually seen in cyanide poisoning by ingestion, such as the

bright pink or red discolouration of mucosal tissues. This feature however is not specific for cyanide.^{9,10} This autopsy showed no discolouration of mucosal tissues, but the blood was bright red in colour. The other feature classically described in cyanide deaths is the presence of a “bitter almond” odour specific for cyanide intoxication. The ability to smell cyanide is an inherited trait. In this instance, a mortuary technician detected the odour. An unusual feature described in the patient who injected herself subcutaneously with cyanide was the presence of macular erythematous lesions which developed into blisters with epidermal necrosis.² In this autopsy, the injection site was surrounded by a black discolouration of skin. The presence of cyanide in the blood and confirmed in the contents of the syringe indicated that cyanide had been injected via the puncture wound.

To our knowledge poisoning by injection of cyanide has not been reported before in Sri Lanka. The victim, prior to his death, had claimed that he had been stabbed. The circumstances therefore are likely to be homicidal. This case report highlights the need for a Forensic Pathologist to consider cyanide poisoning in deaths after injection of an unknown substance where there is respiratory depression leading to a rapid death.

Conflict of Interest

None declared.

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